

Constant Chemical Action of Electricity 65

no constant expression can be given as to the action upon a single particle placed in the course of the current, nor any conclusion of use, relative to the supposed attractive or repulsive force of the poles,, be drawn. The force will vary as the distance from the pole varies; as the particle is directly between the poles, or more or less on one side; and even as it is nearer to or further from the sides of the containing vessels, or as the shape of the vessel itself varies; and, in fact, by making variations in the form of the arrangement, the force upon any single particle may be made to increase, or diminish, or remain constant, whilst the distance between the particle and the pole shall remain the same; or the force may be made to increase, or diminish, or remain constant, either as the distance increases or as it diminishes.

.240. From numerous experiments, I am led to believe the following general expression to be correct; but I purpose examining it much further, and would therefore wish not to be considered at present as pledged to its accuracy. The *sum of chemical decomposition is constant* for any section taken across a decomposing conductor, uniform in its nature, at whatever distance the poles may be from each other or from the section; or however that section may intersect the currents, whether directly across them, or so oblique as to reach almost from pole to pole, or whether it be plane, or curved, or irregular in the utmost degree; provided the current of electricity be retained constant in quantity (113), and that the section passes through every part of the current through the decomposing conductor.

241. I have reason to believe that the statement might be

made still more general, and expressed thus:

That *for a constant quantity of electricity, whatever the decomposing conductor may be, whether water, saline solutions, acids, fused bodies, etc., the amount of electro-chemical action is also a constant quantity, i.e. would always be equivalent to a standard chemical effect founded upon ordinary chemical affinity.* I have this

investigation in hand, with several others, and shall be prepared to give it in the next part but one of these Researches.

242. Many other arguments might be adduced against the

hypotheses of the attraction of the poles being
the cause of
electro-chemical decomposition; but I would
rather pass on to
the view I have thought more consistent with
facts, with this
single remark; that if decomposition by the
voltaic battery
depended upon the attraction of the poles, or
the parts about
them, being stronger than the mutual attraction
of the particles